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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
08/838,910	04/11/97	TANAKA	A 235648

EXAMINER

IM41/0415

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TUNG, T	PAPER NUMBER
ART UNIT	

1744

DATE MAILED: 04/15/98

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

☒ Responsive to communication(s) filed on 3-23-98

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 12-15, 21-37 is/are pending in the application.
Of the above, claim(s) _____ is/are withdrawn from consideration.
☒ Claim(s) 12-14, 27-30 is/are allowed.
☒ Claim(s) 15, 21-26, 31-37 is/are rejected.
☐ Claim(s) _____ is/are objected to.
☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftperson's Patent Drawing Review, PTO-948.
☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
☐ The specification is objected to by the Examiner.
☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.
☐ received in Application No. (Series Code/Serial Number) _____
☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- ☒ Notice of Reference Cited, PTO-892
☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
☐ Interview Summary, PTO-413
☐ Notice of Draftperson's Patent Drawing Review, PTO-948
☐ Notice of Informal Patent Application, PTO-152

—SEE OFFICE ACTION ON THE FOLLOWING PAGES—

BEST AVAILABLE COPY

Art Unit: 1102

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-23, 36, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al in view of Torisu et al.

Sakurai discloses a solid electrolyte sensor element including external and internal Pt electrodes on the external and internal surfaces thereof and a heater adjacent to but spaced from the inner electrode. Each electrode has a protective layer 4 of inorganic material. See col. 3, lines 1-67. Applicant's claims differ by calling for a high-emissivity layer on the inner electrode with an emissivity equal to or higher than 0.3.

Torisu discloses a solid electrolyte sensor element similar to that of Sakurai including a protective layer 4 made of alumina on an inner electrode 2. See the paragraph bridging columns 2 and 3. Alumina has an emissivity of 0.3. See applicant's specification, page 12, table 1.

It would have been obvious for Sakurai to use alumina as the material for its protective layer 4 in view of Torisu, since alumina is an inexpensive refractory substance desirable for the high temperature environment of solid electrolyte sensors. Further, the incorporation of known features from analogous prior art is within the skill of the art. An alumina layer 4 on the inner electrode of Sakurai would have an emissivity of 0.3.

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Applicant's claims also call for a spacing between the heater and the high-emissivity layer of at least 0.1 mm.

This is a very small space and is presumably true of the space between the heater and the protective layer 4 in Sakurai. In any event, it would have been obvious to provide sufficient space to permit adequate gas flow since the inner electrode must contact a reference gas designed to flow between the heater and the inner electrode.

Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al in view of Torisu et al and Pollner et al.

Claim 24 further differs by calling for the high-emissivity layer to have a surface roughness of at least 1 micron. Claims 25 and 26 further differ by calling for the high emissivity layer to have a thickness of 5 to 20 microns.

Pollner discloses a solid electrolyte sensor element wherein a protective layer has a thickness ranging from 0.1 to 500 microns. See col. 5, line 19 to col. 6, line 16.

It would have been obvious for Sakurai to adopt the conventional thicknesses for a protective layer shown by Pollner, since the incorporation of known features from analogous prior art is within the skill of the art. There is no evidence of any unexpected result from the particular values of 5-20 microns.

As for claim 24, the conventional processes set forth in the alluded to passage in Pollner by which the protective layer is made would surely result in a layer that has a roughness of at least 1 micron.

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Claims 21-23, 36, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torisu et al in view of Sakurai et al, Maurer et al or Ker et al.

Torisu, as discussed before, discloses a sensor element including an inner electrode covered by an alumina layer. Alumina has an emissivity of 0.3. Applicant's claims differ from Torisu by calling for a heater to be disposed adjacent the inner electrode.

Sakura (as discussed before), Maurer (col. 3, line 21) or Ker (col. 4, line 23) discloses locating a heater inside a solid electrolyte element near the inner electrode.

It would have been obvious for Torisu to adopt a heater within the solid electrolyte element adjacent the inner electrode in view of the secondary references, since solid electrolyte elements operate only at high temperatures and thus must be heated. Locating the heater inside the solid electrolyte element ensures localized, efficient heating as well as a streamlined sensor configuration.

Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torisu et al in view of Sakurai et al, Maurer et al or Ker et al and Pollner et al.

These claims further differ by calling for the high-emissivity layer to have a certain roughness and thickness. As discussed before, Pollner renders the recited roughness and thickness obvious.

Claims 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ker et al in view of Agarwal et al.

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Ker discloses a solid electrolyte sensor element including a heater located within the element near to but spaced from an inner electrode. The heater has a polygonal cross section. See col. 3, line 46; col. 4, lines 15-39. Applicant's claims differ by calling for the heater to be made of a material selected from silicon nitride, aluminum nitride and silicon carbide.

Agarwal discloses a solid electrolyte sensor element having a heater made of a material comprising silicon nitride, aluminum nitride and silicon carbide. See col. 4, lines 10-17.

It would have been obvious for Ker to adopt the heater material of Agarwal, since the incorporation of known features from analogous prior art is within the skill of the art.

Claims 21-26, 31-35 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

It is not evident what support exists in the original disclosure for the limitation "said internal electrode has an emissivity less than 0.3" (claim 21, line 7; claim 31, line 8).

Claim 32, line 6, the basis for "substantially consists" in the original disclosure is unclear.

Claims 15, 31-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15, lines 1-2, "said material having a high emissivity" has no antecedent basis in view of the amendment at lines 5-6 of its parent claim 12.

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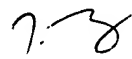
Claim 31, line 4, "a heater disposed inside said internal electrode" is not understood.

Does applicant mean adjacent the internal electrode?

Claim 32, line 6, "substantially consists" is vague.

Throughout the claims, the wavelength at which the emissivity is measured is not specified. It is presumed that the emissivity values in the claims are understood to be based upon the wavelengths set forth at page 2, lines 20-21 of the specification. Applicant is called upon to clarify his intentions in this regard.

The examiner can be reached at 703-308-3329. His supervisor Robert Warden can be reached at 703-308-2920. Any inquiry of a general nature should be directed to the receptionst at 703-308-0661.



Ta Tung

Primary Examiner

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